

Use of Floodplain for Amphibian Reproduction and Larval Development

Expectation:	Near year-round (≥ 9 months) presence of larval amphibians in existing broadleaf marsh and restored broadleaf marsh in areas that currently exist as pasture.
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Relevant Endpoint(s):	Restoration - Biological Integrity – Reproductive Success/Recruitment Restoration – System Functional Integrity – Habitat Quality Restoration – System Functional Integrity – Habitat Use
Baseline Condition:	<p>Baseline data indicate sporadic occurrence of larval amphibian taxa in broadleaf marsh, woody shrub, and pasture habitats of Pools A, C, and D. Larval amphibians were collected on 8 of 22 sampling dates (35%) in broadleaf marsh habitats in Pools A and C. When water was present in these habitats, larvae were present on 8 of 16 sampling dates (50%) in Pool A and 8 of 12 sampling dates (67%) in Pool C. Larval amphibians were collected on 11 of 22 sampling dates (50%) in Pool C woody shrub and 13 of 22 sampling dates (59%) in Pool D woody shrub. When water was present in this habitat larvae were present on 13 of 18 sampling dates (72%) in Pool C and 11 of 18 sampling dates (61%) in Pool D. Larval amphibians were rare in pasture habitats, occurring on 1 of 12 sampling dates in Pools A and C. When water was present in this habitat larvae were present on 1 of 3 sampling dates (33%) in Pool A and 1 of 1 sampling date (100%) in Pool C. Mean water depth was generally > 5 cm when larval amphibians were present.</p>
Reference Condition:	<p>Historical data on amphibian abundance and reproductive phenology in the Kissimmee River ecosystem do not exist. Locality records and distribution maps for amphibians (and reptiles) from counties adjacent the Kissimmee River have been compiled by Bachmann (1996) and provide some information on species composition. Carr (1940) presents a comprehensive review of amphibian (and reptile) distributions throughout Florida, and lists species that are characteristic, frequently occur, or are occasional within each habitat. Carr and Goin (1955) also present the general distribution, Florida range, and habitat characteristics of the herpetofauna of Florida. Auffenberg (1981) lists dominant indicator species of amphibians (and reptiles) for each environmental type in Florida. Additionally, Auffenberg (1982) discusses distribution patterns of the Florida herpetofauna including fauna of the Lake Wales Ridge and Kissimmee Prairie. Habitats listed by Carr (1940), Carr and Goin (1955), and Auffenberg (1981) roughly match historical floodplain habitats described by Toth et al. (1995) and can be used to predict species that likely occurred within these habitats in the pre-channelized Kissimmee River ecosystem.</p> <p>Table 1 lists amphibians likely to use restored broadleaf marsh habitats for reproduction. Taxa are based on distributions reported in Carr (1941), Carr and Goin (1955), Auffenberg (1981, 1982), Conant and Collins (1991), and Bartlett and Bartlett (1999).</p>

Mechanism Relating Restoration
To Reference Condition:

Reestablishment of historic floodplain inundation characteristics is expected to provide suitable hydrologic conditions for near year-round reproduction by adult amphibians and successful completion of development by larval amphibians. It is likely that a depth ≥ 5 cm will be necessary for initiation of adult reproduction and completion of larval development for most amphibians.

Adjustments for External
Constraints:

It is unlikely that any species of amphibian was extirpated following channelization. Restoration of historic hydroperiods and habitat structure will be the impetus for reestablishing near year-round presence of larval amphibians. However, during periods of extreme drought and floodplain drying, larval amphibians will be absent from floodplain wetland habitats. This absence should be viewed as a temporary effect resulting from an unpredictable climatic event (drought), and not an indication that the restoration expectation has not been achieved.

Means of Evaluation:

Larval amphibian sampling will commence approximately three months following canal backfilling and implementation of the interim upper basin regulation schedule, if resultant stages within Pool C are sufficient to re-inundate floodplain habitats to a depth ≥ 5 cm. Methods will include monthly collection of replicate throwtrap samples from randomly selected locations in existing broadleaf marsh and pasture habitats (as defined and sampled under the baseline condition) in Pools A and C (Koebel et al. 2001).

Time Course For Restoration:

Inundation of Pool C floodplain habitats to a depth and duration necessary for initiation of amphibian reproduction is likely once the interim upper basin regulation schedule is implemented (approximately November 2001).

Adult amphibians should quickly respond to restored hydrologic patterns. Near year-round reproduction of amphibians likely will begin within three months following restoration of historic inundation frequencies.

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REFERENCE

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- Bartlett, R.D. and P.P. Bartlett. 1999. A Field Guide to Florida Reptiles and Amphibians. Gulf Publishing Company. Houston, Texas.
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- Mount, R.H. 1975. The Reptiles and Amphibians of Alabama. Agricultural Experiment Station. Auburn University, Auburn, Alabama.
- Toth, L.A., D.A. Arrington, M.A. Brady, and D.A. Muszick. 1995. Conceptual evaluation of factors potentially affecting restoration of habitat structure within the channelized Kissimmee River ecosystem. Restoration Ecology 3:160-180.

Table 1: Florida breeding periods of amphibian species likely to colonize existing broadleaf marsh, woody shrub, and restored broadleaf marsh habitats currently characterized as pasture. Breeding periods are from Mount (1975) and Conant and Collins (1991).

<u>Indicator Species</u>	<u>Spring</u>	<u>Summer</u>	<u>Autumn</u>	<u>Winter</u>
<i>Acris gryllus dorsalis</i> (Florida Cricket Frog)	X	X	X	X
<i>Gastrophryne carolinensis</i> (Narrow-mouthed Toad)	X	X	X	
<i>Hyla cinerea</i> (Green Tree Frog)	X	X	X	
<i>Hyla gratiosa</i> * (Barking Tree Frog)	X	X		
<i>Hyla femoralis</i> * (Pine Woods Tree Frog)	X	X	X	
<i>Hyla squirella</i> * (Squirrel Tree Frog)	X	X	X	
<i>Pseudacris ocularis</i> (Little Grass Frog)	X	X	X	X
<i>Rana catesbeiana</i> (Bullfrog)	X	X	X	
<i>Rana grylio</i> (Pig Frog)	X	X	X	X
<i>Rana sphenoccephala</i> (Southern Leopard Frog)	X	X	X	X
<i>Eurycea quadridigitata</i> (Dwarf Salamander)	X		X	X
<i>Amphiuma means</i> (Two-toed Amphiuma)	X			
<i>Psuedobranchius axanthus axanthus</i> ** (Narrow-striped Dwarf Siren)				
<i>Siren intermedia</i> (Lesser Siren)	X			
<i>Siren lacertina</i> (Greater Siren)	X			

* Likely to occur near upland edges of floodplain.

** Breeding habits unknown.